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Newspeak Volume 09, Issue 06, March 10, 1981

The Students of Worcester Polytechnic Institute

Food Co-op lops expenses

How many people do you know who like to eat? How many people do you know who like to save money? How many people do you know who like to do both at the same time? Obviously, just about everyone fits into these catagories; unfortunately, in the past, it seemed contradictory to try to both eat better and save money. Notice the phrase, "In the past." There now exists a campus organization with the sole purpose of helping WPI faculty, staff, and students both eat better and save money. It is called the WPI Food Coop.

The coop is run on a simple fact of life: when food is bought in bulk from non-profit food warehouses, money is saved. The reason why this terrifically inexpensive method of buying food has not caught on sooner is that previously, it has always been worth the few extra cents to buy food from a grocery store. No longer! When people realize that they can now save from 30 percent to 50 percent on food bills just by joining a food cooperative, they do so. A group of faculty and students and staff at WPI came to just such a realization and took the initiative to begin a good cooperative here on campus.

Co-op members get together on alternate Thursday afternoons to order food that will be picked up one week later. The food is ordered from the New England Food Cooperative Organization in Boston and trucked into Worcester by the Clark University Food Coop. On the pickup days, three coop members drive to Clark and transport the WPI Coop food to the WPI commuters' room. Pre-designated coop members come to the commuters' room at four o'clock and break up the bulk order into the individual members' orders. This includes slicing cheese, weighing bananas, and bagging tofu, among other tasks. At five o'clock, the food preparation is completed and the rest of the members come in, pick up, and pay for their food order, and then finally leave.

The only commitments that a member makes is, firstly, to supply the coop with a refundable deposit on preordered food (about $10) and, secondly, to share in the work of pickup and breakup of food orders (approximately two hours of work a month). The responsibilities of a WPI Food Coop member are small relative to the rewards.

The WPI Food Coop has a promising future. However, a coop is only as effective as its buying power. You need the WPI Food Coop and the WPI Food Coop needs you. Why don't you check it out? For more information contact Pat Allard (Box 1932) or Debbie Chichlowski (791-5681).

WPI Newspeak

The student newspaper of Worcester Polytechnic Institute

Volume 9 Number 6 Tuesday, March 10, 1981

Winter Sports Pullout Inside

New controller works to improve efficiency

by Annamaria Diaz
Newspeak staff

Mr. Frank P. Conti became the Controller for WPI on February 2, 1981. Before coming to WPI, Mr. Conti was a Public Accountant for 10 years. He had also been an Audit Manager for Main, Hurdman and Cranstoun, the firm which audits the WPI financial records. Mr. Conti was impressed with the audit he did here last year, and was also impressed with the people and atmosphere at WPI. He was aware that certain projects were coming up, and he looked forward to becoming involved in those projects.

The Controller is responsible for keeping a watch on the budget, and reviews income and expenditures for academic and non-academic services. Mr. Conti took over the same position and duties as Mr. Barrett had. The Controller, who prepares special reports to assist with the budgeting, is also involved in preparing regulatory forms, which include IRS forms and forms to the government for active research. The Controller is responsible for the Payroll as well.

Mr. Conti is currently working with WACCC, Financial Aid, Admission's, the Registrar's and Student Affairs on designing and implementing a new student billing system. The billing system will attempt to utilize the computer to maximum capacity. The invoices are presently typed directly from the billing card. The goal is to have the system ready by the next billing, but it is not definite at this time.

Mr. Conti is also working in cooperation with WACCC and other related departments to update the payroll system. They hope to be able to get more information from the computer, and want the system prepared to handle any increases WPI may have.

The Controller and other related departments also want to update Sponsored Research and NDSL records with the use of the computer.

An Accounting Procedures Handbook, which has been prepared for use by all departments, should be ready soon. It was prepared mostly by Mr. Robert Finlay, before Mr. Conti's arrival.

Mr. Conti is not here to make a complete turnaround of the Controller's office. He is highly interested in assisting departments with their financial status if they need help. He welcomes comments, questions, and suggestions from the WPI community.

Frank Conti. — Kevin Santry.

Twain exhibit at Gordon Library

"The Writer Confronts the Machine" is an exhibit which examines Mark Twain's fascinations with the technological gadgetry of his time. The primary focus of the exhibit is the writer's obsessive involvement with the famous Paige automatic typesetter, a marvel of nineteenth century mechanics which never worked well enough in practical applications. Twain invested in the typesetter a fortune estimated at between $90,000 and $400,000, and the machine's ultimate failure contributed to his bankruptcy and departure from Hartford.

The exhibit is a project written by four WPI students: Cynthia Canistro,

(continued on page 8)

Campus police acquire new cruiser

by Jeff Roy
Newspeak staff

For the first time in the school's history, a specially marked police cruiser will be patrolling the WPI campus. Last week, the WPI Campus Police received a brand new blue Chevrolet Police Cruiser, complete with lights, radio, decals, sirens, V-6 engine and heavy-duty suspension. The car was purchased from George Luddy Chevrolet in Holden for $8,100.

The car will be on the road later this week, because work is still being done on it in the Stratton garage. Ray Pellerin and some of the members of the Mechanical Engineering Department are installing the radio and other touch-ups.

According to WPI police Chief, Al Whitney, "This is the first full police package cruiser that we've had at WPI. We used to have a station wagon which was used as a cruiser and ambulance back in 1974 [before the city had expanded it's ambulance service], but this is the first fully packaged cruiser. It will be here for emergencies and has a lot of nice features."

Some of the features that Whitney outlined included lights which are enough to light up any of the buildings at night (alley lights). It is also equipped with a light bar which will enable them to not only move through traffic quickly, but will add a safety feature to signal where an ambulance should come in case of an emergency, for instance.

Currently, the WPI Police are operating with an unmarked (green) Ford Fairmont. The new vehicle should provide more efficiency as far as police work on the WPI Campus is concerned. Whitney assured that the vehicle's cost was in line with the Massachusetts Council purchase price of a police vehicle, although the school did not purchase it through that agency.

EDITORIAL

Wasting energies on wasted energy

Much has been said about the many facets of the energy problem. "Frontiers" are being "discovered," "aspects" are explored" and "viewpoints" "considered." What this all means is that a number of approaches exist in examining the usage of energy.

Before we immerse ourselves into the rhetorical quagmire of these many approaches, let us step back and have a look at the entire process. Two steps are immediately apparent: energy is produced and energy is consumed. In regard to meeting energy needs, two overall strategies result from this view: produce more energy or consume less energy.

This institute recently sponsored APEC (A Positive Energy Conference) II, which billed itself as "the energy frontier." This conference concerned itself entirely with the "produce more energy" half. This tunnel vision was coupled with a viewpoint that the production of energy must grow indefinitely to meet needs and, we are told, assure our well being for us.

That the emphasis would be on energy production was something made clear to us from the start. There is nothing inherently wrong with a conference devoted to this important topic. What is unfortunate is that a conference of such limited scope chose to call itself "the" energy frontier.

Reducing energy comsumption is nothing to scoff at. When conservation is proposed, one envisions turning lights off and thermostats down. It is at once hard to imagine that **one's doing so can result** in significant **savings and easy to imagine** that nobody else is pitching in; yet the average home, when properly insulated, can reduce its energy consumption by 50 percent. On a national scale this translates to a total energy savings of as much as 40 percent.

We can, for the purposes of this paragraph, view this 40 percent savings as a source of energy (at the risk of blurring the distinction made above). As a source, it is much cheaper, much cleaner, and exacts much less of a toll on our finite resources than any source in use today. Consider also its magnitude. Why, then, did "the "energy frontier" neglect to consider it even in passing?

There are further savings to be realized from the consumption side of the energy coin. Cogeneration, a technique in which normally wasted energy — usually thermal — is put to use, shows great promise. In use since the early 1900s, and once supplying 22 percent of industry's energy, cogeneration is primarily utilized in industry. A typical system can entail the use of excess heat, usually lost up a chimney, to generage electricity. Leading industries today report energy savings of 40 percent with this technique.

The basic viewpoint expressed at the conference was, as mentioned above, that increasingly more energy must be produced to meet escalating

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Newspeak (USPS 535-480)

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WPI *Newspeak* of Worcester Polytechnic Institute, formerly the *Tech News*, has been published weekly during the academic year, except during college vacations, since 1909. Letters-to-the editor must be signed and contain a telephone number for verification. *WPI Newspeak* is a member of the Columbia Scholastic Press Association and the National News Bureau. *Newspeak* subscribes to Campus Digest, Collegiate Headlines, and National On-Campus Reports. Editorial and business offices are located in Room 01, Sanford Riley Hall at WPI. Copy deadline is noon of the Saturday preceeding publication. Printing done by Colony Press, 314 Washington Street, Auburn. Second class postage paid at Worcester, Massachusetts. Subscription rate is $5.00 per school year, single copies 20 cents within the continental United States. Make all checks payable to *WPI Newspeak*.

LETTERS

APEC II is positively nuclear

To the editor:

The positive energy conference which was presented at WPI the weekend before last was "positive" in one disturbing respect: it was positively one-sided. This was most clearly brought forth in the biased view of the "keynote speech" given by a Mr. Sklar, some lawyer/state legislator from Maryland. While reviewing the more well-known energy possibilities, this man proceeded to ridicule and dismiss every alternative to oil, from synthetic fuels to solar; with the exception of nuclear, which he regards as indispensable. The only thing he riduculed concerning nuclear power was "all the fuss about radioactive waste disposal."

Unfortunately this was not only the opinion of the speaker, but also the theme manifested throughout most of

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Gong Show coverage gonged

To the editor:

After the gong Show Saturday night and seeing Newspeak photographers in the pub, I was shocked when I looked at Tuesday's paper and did not see photos of either Sigma Pi Band or Bill Brothers, the two winners of the show. I cannot understand the reasoning behind running pictures of those who got "GONGED" and not those who really deserved the coverage. Something else which crossed my mind was why were there two pictures of one act (the RA Band) and none of the winners?

Granted there was not enough space to print pictures of all eight acts, the judges, and the arm wrestling, but it seems to me there could have been better planning when the article and the layout were done.

Heather MacDonald '83

Tuition increase unjustified

To the editor:

The Reagan administration inherited an economy in shambles. Budget cuts across the board are necessary to put America back on the right track again. Sacrifices will have to be made by everyone.

But the federal government will not and can not succeed in its efforts, without support of all Americans and institutions.

It is unfortunate that WPI saw fit to increase tuition and room and board costs. WPI not only violated federal government voluntary guidelines, but also put an added strain on WPI students struggling to pay for their education. Increased appropriations for financial aid are not enough. Less than half of all WPI students qualify for such aid.

Budget cuts by the federal government are needed in response to the nation's poor economy. Are WPI's increases just as justified? I think not.

WPI! Don't use other college tuition

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School spirit works

To the editor:

I would like to thank the hundreds of students who attended our basketball game against Clark on Saturday, February 28. It was the largest crowd to see a WPI basketball in several years. It is also the first time that anyone can remember when there was a line waiting to get into Harrington to see our team play. We were very disappointed that we lost such a close game; however, the spirit and the excitement at the game was a tremendous inspiration to our team.

The students who were present at our rally on the day before the game were very receptive and we thank them also. We are all looking forward to next year when we start the basketball season with our own basketball tournament. One of the teams in the tournament will be — you guessed it — Clark!

Thanks again,
WPI players, cheerleaders and staff

Correction

In last week's article on the 81-82 Budget *Newspeak* wrote that each non-academic department submits its budget request to Mr. Thomas Denney. This is inaccurate. Each non-academic department sends its budget request to its respective Division Head (PAC Members) who then forward them to Mr. Lloyd. Mr. Lloyd then puts all budget requests into model form for review by President Cranch. The respective Trustee Committees review the outcome.

JP going well

To the editor,

Junior Prom Weekend, which is May 1 and 2 will prove to be yet another success since Bob Sinkewicz came to office as social chairman at the start of C term. The Junior class along with the Social Committee have been working with enthusiasm and diligence to make this year's weekend a repeated success of last year's weekend. There has been a great deal of input from members of the Class of 82. Something which makes the job of Chairman a lot more exciting and worthwhile, and I would like to thank these people very much for their time and efforts which they have contributed so far.

I hope that many of you are looking forward to J.P. weekend. A great deal of hard work is being put into it, but none compared to what is facing us in the next couple of months. We will be looking for people who are willing to sacrifice a little time to help prepare the decorations, work the nightclub, etc. Unfortunately we cannot be generous with material rewards, but just having a hand in the actual works can make your weekend a bit more enjoyable. If anyone would like to help out, you can write to myself, David Rubinstein Box 871 or Chris Wraight Box 1854, or give us a call.

I hope to see you all on May 1 and 2 having an excellent time at Junior Prom weekend, because it's going to be great.

David Rubenstein '82

Forum display vandalized

To the editor:

Recently in *Newspeak*, there was an announcement by The Forum that they would have a display case outside of the ticket office in Daniels Hall to post "educational materials." This display was to be changed weekly. This past week's display presented a very much distorted view of nuclear power, but I don't want to pursue that aspect here.

Some time on Thursday night or Friday morning, this box was ripped off the concrete column. Action of this type cannot be condoned. The right to express opinions or editorialize belong to all, whether they be groups or individuals. The destruction of WPI property is not a right — it is vandalism. If you disagree with the outrageous stands taken by The Forum, let them know, but do it in a civilized manner. For example, you can let them know by showing up at their meetings and expressing your

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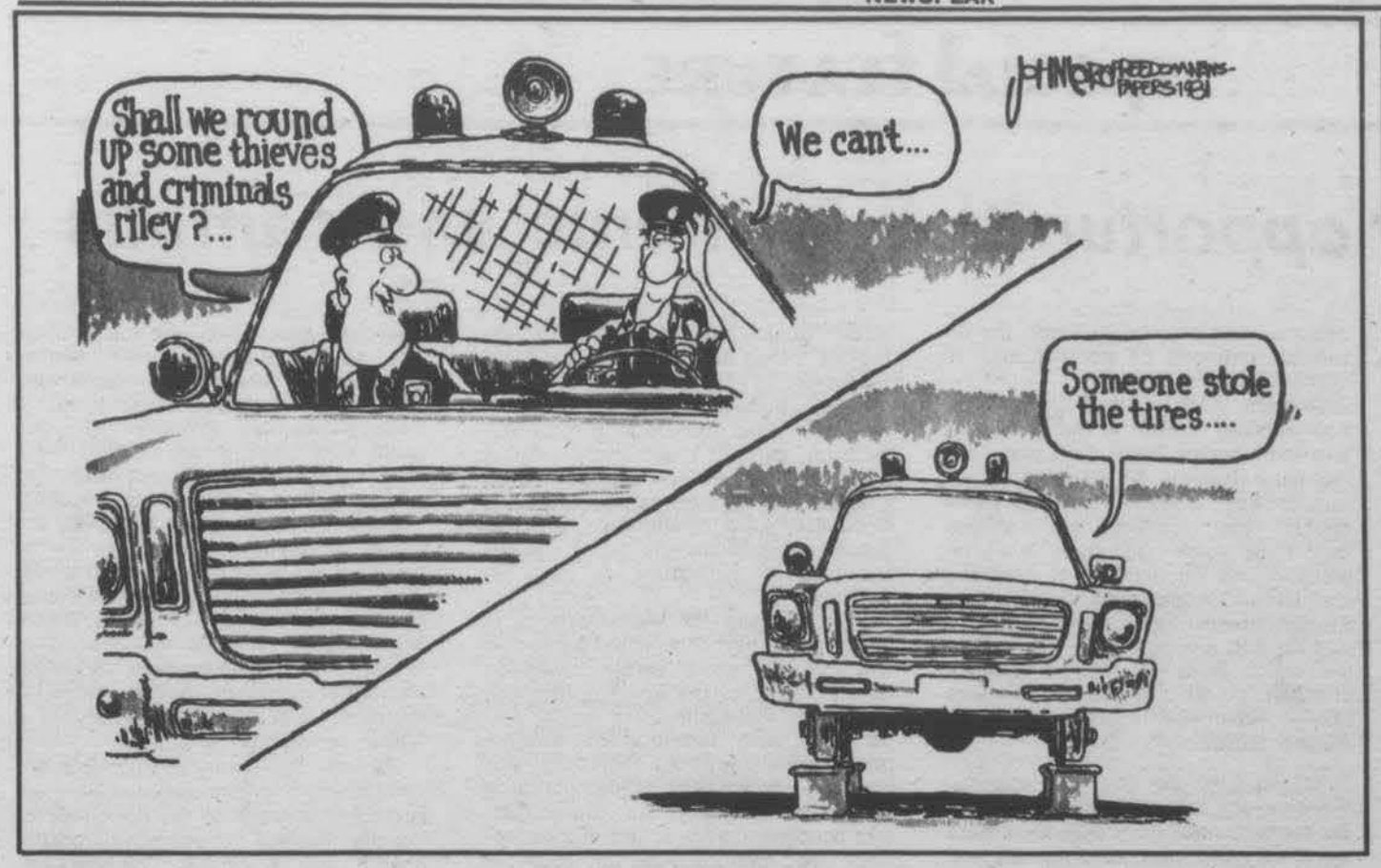
"To Whom It May Concern: Will the student who borrowed my Scale during the recent exam please return it to me. It is essentially irreplaceable and has sentimental value for me."

Prof. F. A. Anderson



WPI to secede from U.S.

by Steve Kmiotek
Newspeak staff

I think WPI should secede from the Union. It wouldn't have to be big and bloody — just block off campus, set up a headquarters in Boynton, build a few bombs, and torture a few professors (make them sit through tapes of their lectures or something). It would probably be wise to take some political prisoners, too — maybe lock a dean up in WACCC.

Why? For one, it would make a great project. Also, it would be very interesting to see Washington's response. I could just imagine a press conference with the Defense Department.

"We would like to report that WPI has just seceded from, and thus declared war on, the United States."

"What is WPI?"

"It's a small engineering college in Worcester, Massachusetts."

"Let the whole city secede!"

"If we lose WPI, we lose our first strike capabilities against Holden and Millbury."

"I thought this was the Department of Defense, not Offense."

"No comment. Besides, there's always dominoes. If WPI falls, Clark and Holy Cross would be next."

"What do you plan to do about this?"

"All we're planning for now is to send military advisors into Worcester to help Worcester authorities reclaim the college. These are strictly advisors — they will not be involved in any actual fighting."

"Isn't that how Vietnam started?"

"I'm sorry, I don't see the connection. Vietnam was an Asian country being overrun by Communists. This is an American college being run by some damn punks. We feel totally justified in assisting the municipal government."

"Is there the possibility of using American soldiers to regain the campus?"

"Never. We have discussed sending the Navy down the Blackstone River and the possibilities of strategic air strikes on the campus, but no lives will ever be jeopardized to regain Hill #3."

"General, is there any word on the situation in El Salvador?"

"Our advisors there report an appalling lack of supplies, so we're sending down a few tank divisions and half the airforce, but there is no danger of American lives being jeopardized in the Carribean. El Salvador will not be another Vietnam. Good day."

Morning thoughts at WPI

by Gregg Miller
Newspeak staff

Brrrriinnnggg! Brrrriinnnggg!

Huh? Where's the telephone ... Where am I? Where's the telephone? I can't see. Where's the light switch? Huh? ... Damn!

Stupid alarm! Whomever invented those things must have known the Marquis de Sade. Or maybe it was some Russian agent — no doubt ingeniously constructing the alarms to aggravate the imperialistic American dogs.

7:20 a.m. What day is today? Tuesday — class at 8 in Kinnicutt ... I didn't go yesterday or last Friday but it doesn't matter. I understand that material. Right?... Wrong! I guess I'll go, just need to rest my eyes for a few minutes. The bed's so nice and warm...

Zzzzzzz...

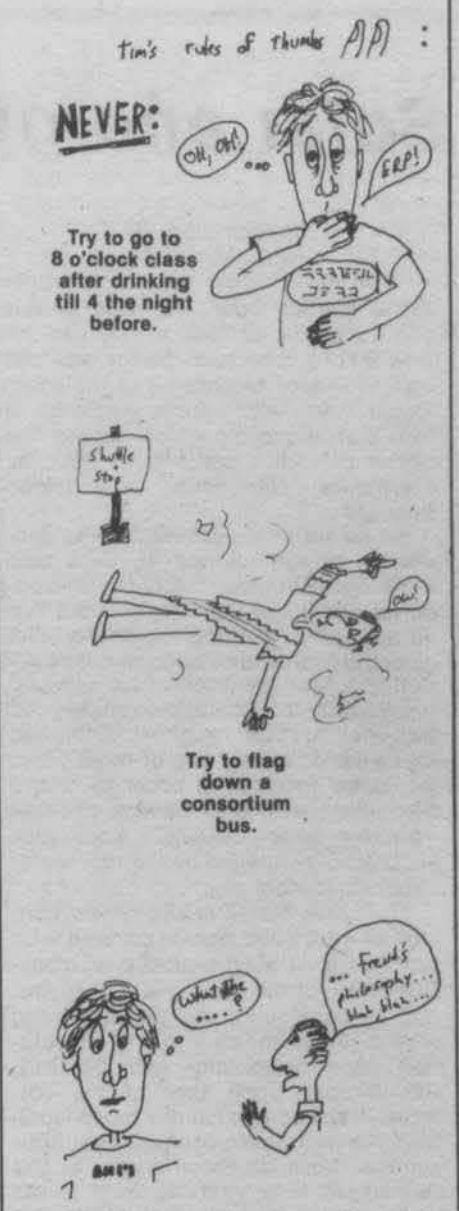
Huh?! I must've fallen asleep. What time is it? 9:30 a.m. What time is it? Tuesday? I mean what *day* is it? Jeez, too many beers at the pub last night. Let's see — another class at 10. No time for a shower ... but I smell pretty bad from the basketball game last night. I can't go to class smelling like this!

Good argument — think I'll go back to sleep. Besides, if I sleep now I can stay up late tonight studying for my test tomorrow ... Right?... Probably not.

No matter — it's won't show up on my permanent record if I fail ... Then again, there isn't much *on* my transcrip (after 2½ years). But ... I'll worry about that tomorrow. For now, it's time to escape into sleep ...

This bed's so nice and warm...

Zzzzzzz...



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SATIRE

Chemistry: Neptune

by John Farley
Newspeak will print responses to 'Comps,'

The Pioneer Spacecraft, launched in 1972, will pass the planet Neptune in 1983 and scientists from all over the globe are getting very excited. They expect Pioneer's sophisticated optical equipment of coke bottles and flashlights to reveal a lazy, moody, but colorful atmosphere. Some scientists feel that Neptune's core surface has the consistency of a Baked Alaska, while other insist it is not unlike that of buttered jello. Most experts, though, agree that its bubbling formations mostly resemble cream cheese & chives.

Qualitative analysis techniques have failed to turn up anything definite about Neptune's chemistry. Once a specimen is available scientist feel they'll have more success. Consensus is strong that not even primitive life forms will be found on Neptune, although one scientist is sure he spotted a raccoon through his binoculars.

Concerning the possibility of life on Neptune, one science fiction writer helps us get a feel of what it may be like: "Since Neptune is almost 3 billion miles from the sun, getting a tan requires a great deal of patience. And since it takes Neptune 165 years to make one revolution around the sun, most people don't live to enjoy the

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comps we'd like to see

Kid to star with 'Ronnie'

Just when you thought it was safe to go back to reading *WPI Newspeak* again, Kid Commuter returns after being alienated from the press for the entire C-term. Rumors were even spreading that the Kid has moved on campus and changed his name.

Well, rest assured, Kid Commuter has not moved into any housing on or near the WPI campus. I am, and always will be, a faithful commuter; rain, snow, sleet, or lack of adequate parking. Rumors, rumors, what can be done with rumors?

What the Kid Commuter has been up to for the past seven weeks has involved a contractual agreement with General Motors to solicit their vehicles, including their newest model, the KidCat. Up to now, my name has been stamped only on Chocolate Bars, but hey, it's a complex world, and I'm moving up to bigger and better things. I have also been working on a new record-album working with none other than *THE CARS*. I'm doing back-ups.

"You don't have to be a commuter to understand the Kid," admitted Ted Koppel for ABC's Nightline.

In other news, the Kid Commuter has been asked by President Ron (we're on a first name basis) to conduct a survey. He wants me to find out which of his films are most appealing on the WPI campus. I indicated "Bedtime for Bonzo," seeing it was the only one I saw. Ronny has been considering a sequel for the piece with the Kid as his co-star. Some of the titles we've been toying with include, "Bedtime for Kid Commuter" and "Nuke Ronny and the Kid."

* * * * * * * * * * * * * *

On the subject of mail, one puzzled

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kid COMMUTER

special feature

Solar energy opportunities for home and campus

by Rich Bibbins
Newspeak staff

With the growing need for cheaper home heating sources, many people are beginning to look to the sun for new BTU's. One such person was our own Professor McQuarrie of the Math Department, who transformed a novel idea into a project which gained the notice of such magazines as *Popular Mechanics, Handyman* and *House Beautiful.*

As he sat in his car noting the convection of sun-warmed air on a cold morning, Professor McQuarrie wondered if the same principle could not be applied to heating his home. The outcome of this idea was the construction of a heat collector which reduced his heating bill by approximately 25 percent. At this rate, he estimated that a period of only two or three years would be required in order to return his initial investment. Several of these "passive solar heaters" were also successfully installed by the Worcester Labor Co-Op last year.

The basic design of the heater consists of a plywood lean-to covered with two layers of acrylic plastic or glass. The frame of the structure is plywood, and its base and sides are laminated with plywood sheets and 3½" insulation. After preparation with flashing, the vertical, open side of the collector is placed against the house, such that it covers a basement and first floor window. Through these apertures the cool air will flow from the lower levels to be heated and circulated into the first floor. As the interior of the heater often reaches 110 degrees during full exposure, a residence's daytime temperature may climb to 72 degrees with a thermostatic setting of only 68 degrees. This obviously depends upon the angle between the heater's face and the sun; therefore the slope of the tent is usually 15 degrees greater than the latitude of the area.

The technology of the solar industry is changing along with that in many other engineering disciplines. In the case of Professor McQuarrie's design, additions of black aluminum foil, air baffles made of metal, halved beer cans for reduction of heat reflection, and fluffed steel wool painted black to absorb a greater amount of radiant energy have tremendously improved the efficiency of the collector. Also, the decision between glass, plastic, and fiberglass sheets for the exposed surface is largely a factor of strength, thermal gradient, and reflective loss. Supplementing the single sheet with a second layer — separated by ½" of air — has apparently made the difference between 87 percent and 70 percent loss of energy.

Another WPI faculty member who has involved himself in the solar pursuit is Professor Frank Swenson, who has been studying the effects and performance of the Stoddard C solar water heater. This mechanism was installed over three years ago, under the auspices of the Department of Housing and Urban Development (HUD). The Student Health Service and Professor Bill Wright, among others, assisted in the effort. Because of the frequency of repairs on the unit, the collector was taken down for reconstruction in August, 1980.

The system was shut off and dismantled, the collection boxes slid onto the rooftop. After the plastic heat traps were removed, the absorber surface was cleaned and refinished. Because the separator of polycarbonate plastic was extremely sensitive to high temperatures, it was permanently withdrawn from the apparatus. The renovation crew also replaced four heat "dumps" with four heat "collectors", thus increasing the flow area subjected to the sun's rays. These changes, in addition to improving the system's fluid (ethylene glycol) circulation, made it much more reliable and leak-free, as well as eliminating the need for an emergency, overheat, circulation loop. In the long run, this project, subsidized by HUD, makes the trade of reliability for peak efficiency.

This exchange of characteristics is only a small part of a growing trend in the industry as a whole, Swenson notes. "State of the art required high efficiency. Reliability is now the key concern, with temperature-sensitive parts minimized." At this time, net heat collection is of greater importance than peak efficiency. As solar collectors become less novel and more practical, the manufactuers of collector boxes, now numbering about 30 nationwide, will be able to aim more of their market at the average consumer, who purchases his heater to quickly cut expenses.

The modification of existing homes has been and will be the mainstay of the solar industry. While neither Swenson nor McQuarrie are optimistic about the effect of Reagan's cut in energy subsidies, Professor Swenson feels that "the thing holding back solar panels is high interest rates," as is the case with any home improvements. Various solar companies are going to struggle for survival in the next few years, he believes. Consolidation of collector and/or controls manufacturers, plumbing specialists, distribution center combinations, more prefab solar homes, and greater corporate change of ownership are therefore inevitable, although the industry is a viable, hiring one.

As with Professor McQuarrie's development, many innovations have occurred as a result of the new interest in solar heating. For example, in Stoddard C, the relationship between collection, storage, and load systems has been studied extensively. Since only showers and washbasins are provided with hot water there, peak loads are simply observed and applied to the three systems. Heat transfer losses due to wind, rain, and cold are of special interest to Swenson, as is the energy effectiveness of tracking the path of the sun over certain daylight intervals. The fluid, temperature, and flux of the sun are critical to decisions relating the collection, storage, and load of heat-exchanging flows.

On the national scene, "new ideas and products are taking care of old problems." Plastic extrusions are replacing heavier, more expensive copper tubing. New solar opportunities have "stimulated imaginative architectural activity, gotten people thinking, and created a market of solar-related products." Determining the values of various fluids — like glycerin and ethylene glycol — based on thermal properties, cost, circulatory characteristics, etc., is another aim of sunshine R&D.

"The other interesting part of solar is common sense — like leaving draperies open at night," says Swenson. Apparently, many students are beginning to recognize the value of this energy alternative; ten IQP's are scheduled under Professor McQuarrie, and a few work-study and MQP openings will most likely be rapidly saturated in Professor Swenson's department. A course is currently being taught on the subject, as well. Anyone interested in participating could perhaps express their interest by replacing the tailless rooster on the Stoddard C weather vane!

Solar project in Boston teaches students solar construction

If you are looking for a summer experience that is really different, the Homebuilding Resource Center of Cambridge, Mass. may have the answer. It offers the opportunity for students to participate in the building of a house this summer.

Those enrolled in this program will find themselves building foundations, raising walls and cutting rafters. Students from all over the country will spend three intensive weeks together in seminars and small work groups building a passive solar house from scratch in a suburban Boston location.

Guided by experienced teachers and builders, the rigorous program is only for students willing to dedicate themselves for three weeks to learning the essential skills of homebuilding and design.

According to Program Director Herb Ziegler, "The skills are not that difficult to learn and ... it's an incredibly satisfying experience." Ziegler, a Harvard grad turned carpenter and builder, believes that having an exciting, physical, intellectual and spiritual experience is "...practically unavoidable."

Each of the five three-week sessions is limited to 30 students. Prior building experience is not required.

For admissions information write: Herb Ziegler, Program Director, Homebuilding Resource Center, 2 Hancock Place, Cambridge, MA 02139 or phone: (617) 491-5181.

The energy crisis: menace or opportunity?

by Lewis H. Gann
Stanford University
Public Research, Syndicated, 1981

analysis

The rise in the world's oil prices has thrown the world's doomsday sayers into a new mood of depression. The forecasts currently made by many Western experts would make Cassandra into an optimist. The age of the consumer — we are told — is over; technology has come to the end of its tether; worldwide poverty is inescapable; Western civilization faces breakdown.

The villains held responsible for our predicament are many. They comprise the Western consumer who heedlessly squanders the global oil reserves by cruising on the freeways with his girlfriend, or, more respectably, by driving his children to suburban cub scout meetings or ballet lessons. Another project of public opprobrium is the Arab oil sheikh, that stock figure of newspaper cartoons, a hooked-nosed scoundrel in flowing robes whose greed results in ever increasing oil prices, and thereby contributes to worldwide inflation and global poverty.

Oddly enough, the higher a country's living standards and the lower its dependence on foreign oil imports, the greater the pessimism evidenced by many of its leading specialists. The prophets of gloom are most numerous in the United States and Great Britain; these are the very Western countries that are least dependent on oil shipments from overseas; both are favored by geography with large reserves of oil and coal; both can draw on an impressive reservoir of scientific and technological skills of the kind needed to cope with current energy problems.

Our energy problems are real enough; so is the present economic recession. But our existing problems should be kept in perspective. They do not amount to an earth-shattering catastrophe. The last thirty-five years have in fact seen an almost incredible recovery after the devastation of World War II; during his or her lifetime, every middle-aged American has witnessed a phenomenal increase in living standards both in the developed and in many parts of the undeveloped world. This prosperity would have been unimaginable to our parents in the 1930's when capitalism, according to its many critics, was doomed to permanent breakdown.

The Western economic miracle was helped to some degree by new discoveries of oil. Between 1939 and about 1965, the industrial world increasingly shifted its supply of energy from horsepower (still the main power of locomotion for Hitler's armies in Russia during World War II), and from coal. Oil became the world's major source of energy and continued to be produced in even larger quantities. Until 1974, oil prices actually declined in real terms. Thereafter prices increased, but for all the international hullabaloo concerning OPEC's alleged rapacity, the average American worker needed less time in 1980 to earn the cash to buy a gallon of gasoline than he

special feature

Photochemistry research may be key to solar future

by Tom Nicolosi
News-Features editor

When one speaks of new energy resources, the subject of solar energy is invariably broached. This is not surprising, since all of the world's energy sources originally came from the sun. However, the direct conversion of sunlight into electricity is a relatively new idea that offers exciting possibilities for the future.

New research in the science of converting the energy of sunlight into useful forms is now underway under the auspices of the WPI chemistry department. The research being done is in the area of photochemistry, the little understood science of how light energy effects various chemical reactions.

According to Prof. James W. Pavlick, Chemistry Department Head, the research which is still in its infancy is centered in two main areas — the conversion of light energy directly into electricity in what is called a *photogalvanic cell,* and the synthesis of various chemical compounds with the aid of sunlight. Both processes hold promise as a source of future energy, yet those doing the basic research in these areas will be the first to admit that there are major problems to be overcome.

The basic principles involved with these processes are rooted in the physics of surfaces. The material which reacts to the energy of the sun is a semiconductor called titanium dioxide (TiO_2). So far the titanium dioxide has proven to be the best semiconductor for use in the conversion of sunlight in the manner being studied, because it does not deteriorate under the reaction conditions. Sunlight is converted to electricity in what are called half cell reactions in a similar manner to the way electrical energy is extracted from batteries. A conventional galvanic cell produces electricity by the addition and subtraction of electrons from chemical compounds in what are called redox reactions. The result of these reactions, which take place at two electrodes in a water solution, is a flow of current. The problem with batteries is that they eventually wear out when the chemical reactions that sustain the flow of current proceed to completion. The chemical driving forces which induced the exchange of electrons and the flow of current are no longer present and the battery must be discarded. In the photogalvanic cell, however, the energy in sunlight is used to drive the exchange of electrons in various chemical species which results in a flow of current. This is different from the conventional battery in that the driving force for the current flow is not the chemical reactions that take place within the cells of the battery, but is the light energy of the sun. The photogalvanic cell would be able to produce electricity as long as it were exposed to a source of light.

Another area which is being researched is the use of the energy in sunlight to synthesize useful chemical compounds. One such synthesis which may prove useful in the future as far as energy production is concerned is the synthesis of hydrogen and oxygen from water. This reaction is an "uphill" reaction — that is, in order for the water to be converted into hydrogen and oxygen a significant amount of energy must be expended. In this case the semiconductor would be used as a sort of catalyst to the reaction. The energy needed to drive the reaction would be supplied by sunlight. The hydrogen recovered from the reaction could serve as a useful fuel.

These possibilities seem very promising. Said Dr. Piotr Starewicz, a visiting professor from Poland who is working with Pavlic on some aspects of the research, "Hydrogen would be the perfect fuel since it is entirely pollution free." Only water is produced when hydrogen is burned. While being optimistic, Starewicz is careful to point out that the production of hydrogen for use as a fuel is still, "far away." Yet the prospect of producing what Starewicz calls a "renewable resource on the biggest scale there is" remains enticing.

Right now there are many barriers to the development of photochemistry on any kind of scale. There still remains a great deal of basic research that needs to be done. One of the big problems being faced is the lack of suitable semiconductor materials. Titanium dioxide which is now being used extensively in the research is a cheap, readily available material (it is commonly used today as the white pigment in ordinary house paint), and durable material but it does not yield efficient conversion of the sun's energy. Unfortunately it appears that materials which are thought of as more suitable for the conversion of the energy in sunlight are subject to corrosion when exposed to sunlight under reaction conditions. Said Pavlick, "The search is for new materials that are stable to irradiation." According to Pavlick, the lack of understanding of the photophysics of semiconductors is the reason why the corrosion cannot be controlled.

So far at least fifty groups around the world are studying the science of photochemistry and its potentials, according to Starewicz. The research at WPI is being done in conjunction with General Telephone and Electronics as part of a serious research program that also involves research groups at Brown University and MIT. In fact, a proposal is now in the process of being written for the continuation of the work now being done at WPI. It is hoped that a grant from the National Science Foundation will be awarded for the continuation of the research.

Liquefaction to improve coal as a resource

by Bob Thivierge
Newspeak staff

Professors A.H Weiss, W.L. Kranich and K. Guruz of the Chemical Engineering Department at WPI are presently conducting a project dealing with coal liquefaction. The main focus of the research is on a low-rank coal called lignite. Because of certain restrictions involved in the use of coal and solid, it is advantageous to change the solid form into a liquid fuel. Professor Kemal Guruz, Visiting Associate Professor of Chemical Engineering, cited several reasons why coal might be changed into a liquid fuel, and outlined the various methods used in doing so.

Professor Guruz pointed out four different reasons why coal is changed to a liquid form. One reason is due to environmental restrictions. Liquefaction aids this problem since during liquefaction pollutants such as sulfur and, to some extent, nitrogen are removed. Another reason why coal would be liquified is related to the fact that coal cannot be used as a fuel in transportation, which is usually achieved with diesel fuel or gasoline. Under proper conditions and using the correct process, coal can be transformed into gasoline. It is also more difficult to transport and store coal. Furthermore, a liquid fuel is much easier to burn than coal.

Professor Guruz explained three different ways that could be used to convert coal to liquid fuel. As a solid, coal has a low hydrogen to carbon ratio, in comparison to liquid fuels which have a relatively high hydrogen to carbon ratio. It is therefore necessary to increase the hydrogen to carbon ratio in coal in order to bring about liquefaction.

Herbert Beall — John Delaney.

One means by which the ratio can be increased is through the direct addition of hydrogen (H^2) to coal. The direct method has the economic drawback of having to pay for hydrogen, which is expensive. Another alternative method is through the use of a process called pyrolysis, which is the extraction from coal of volatile materials in the absence of oxygen (0^2). The difference between the two processes is that direct liquefaction increases the actual amount of hydrogen in the coal sample, while pyrolylis decreases the amount of carbon to achieve the same result — a higher hydrogen to carbon ratio. A third method of liquefaction of coal is through what is termed indirect liquefaction, and presently there are two different methods of achieving this. There is the process of gasifying coal by reacting it with O^2 and steam to form carbon monoxide (CO) and hydrogen gas. The resulting product is called a synthesis gas which is then reacted according to the Ficher-Tropsch method to produce liquid hydrocarbons. Another indirect means to liquify lignite is through the Methanol (CH^3OH)-to-Gasoline (Mobil MTG) method. First, lignite is again gasified. The resulting H^2CO mixture is then converted into methanol and then reacted using the MTG process as a means to produce gasoline. The MTG process seems to be efficient, however, it is relatively new and commercially untested. All the above processes are technically possible. However, it is the economic conditions and the relative costs of petroleum-derived fuels pertinent to the particular process that dictate whether coal should be liquified, and if so, which process should be used.

The current project work at WPI involves the use of direct liquefaction and requires the use of instrumentation that can create pressures as high as 1600 psi at temperatures of 400-450°C.

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did in 1950.

This is not to underestimate the problems occasioned by the recent increases in oil prices for the developed and, even more so, for the underdeveloped world. The Gulf War, by damaging oil production in Iraq and Iran has done serious harm to the economies of these two countries and of the world at large. If the West were cut off by some sudden stroke from its Middle Eastern oil supplies, the results would be catastrophic. Nevertheless, the part played by OPEC and by the assumed worldwide shortage of energy in bringing about the present recession can easily be overestimated. Ironically, the two major Western countries with the lowest economic growth rates are the U.S. and Great Britain, the two powers least dependent on OPEC oil imports. By contract, West Germany, Japan, and Switzerland, none of which has a single oil well in its territory, have done better in the economic field than their English-speaking competitors.

Many of our difficulties are in fact of our own making, not OPEC's. By controlling the price of natural gas, we have deliberately kept down supplies and caused shortages to develop. Our policy with regard to oil has been equally inept, and the Republicans' record in this respect has been no better than the Democrats'. In 1975, for instance, President Ford failed to veto the Energy Policy and Conservation Act, a law dubbed by its opponents as the OPEC Relief Act. As a leading scholar such as Thomas Gale Moore has pointed out, we proceeded to tax our own producers in this country, using the proceeds to subsidize imports. Our policy caused the cost of imported oil to drop, whereas the cost of American-produced oil increased. Not surprisingly, oil imports rose rapidly in the 1970's until they amounted to nearly half of our total supplies, compared to less than a quarter of the total at the beginning of the 1970's.

What of the future? The outlook is not as bad as the pessimists assume. As long as energy was cheap, consumers had no incentive to save on their heat and fuel bills. The problem was compounded by political propagandists who persuaded the credulous that the problems of energy somehow derived from the conspiracies of bankers and oil sheikhs, and that great tankers, filled to the brim with oil, had been maliciously hidden off our coasts by the oil companies.

As oil and gas prices are fully decontrolled, and as prices continue to rise, consumers will increasingly invest in smaller cars, domestic insulation, and so forth. As Suliman S. Olayan, an international expert, points out, the price increases since 1973 have already occasioned remarkable improvements. The long-standing disparity between oil prices and prices for other forms of energy has disappeared Domestic consumers and industrialists alike have begun to heed the call for energy conservation and a more efficient energy use. The development of extensive new fields in the North Sea, Alaska, and other parts of the world is under way. Energy users have increasingly looked to other forms of energy, including coal, natural gas, synthetic fuels, solar power, and the like.

If we are determined to deregulate energy, we shall be able to draw on adequate supplies of traditional fuel for the rest of this century and well into the next. If we expand nuclear power, as the Soviet Union and its allies are resolved to do, we shall unlock great new sources of energy. We should not let an unfounded pessimism obscure our true prospects for the future. Prosperity or poverty — the choice is still our own.

Rare Twain manuscript found and reprinted

The following piece of prose, which purports to be a previously unpublished composition by Mark Twain, was recently found in the Lungfish collection of Americana by a Professor of Belles Lettre at the College of Veterinary Sciences in Nevada. We leave it to the reader to evaluate its authenticity.

By Mark Twain

I was always awe-struck by mechanical gadgets, an attitude perhaps owing to my youthful days as a printer. My apprenticeship in the print shop taught me the frustrations of hand composition, setting type and preparing it for press.

It was therefore with eagerness that I welcomed to my Hartford home a man named James W. Paige, who proposed my investment in a new machine that would transform the typesetting industry. It was then that the music began.

At that time that lunatic inventor Paige struck me, in my naivete, as a poet, a great and genuine poet whose sublime creations were written in steel. He seemed to be a Shakespeare of mechanical invention.

Paige regaled me with over 200 pages of design drawings and over 100 specifications for the machine. The Paige Typesetting Machine became to me a mechanical marvel created by an inventor who seemed no less than a divine magician. It made all other wonderful inventions of the human brain sink nearly into the commonplace by comparison.

While the dollars from my writing were poured into investment, I dreamed of completing my book on the Hartford mechanic in King Arthur's Court. Believing that everything I touched would turn to gold, I dreamed of writing the last line of *Yankee* at the same moment that the Paige Typesetter printed its first line of automatic type. Then the tide turned.

The machine took on a personality of its own. It was a cunning devil when it was ornery; a magnificent creature in its infrequent moments of operation; a sick child when its thousands of parts broke or misfired.

I watched over this project for years and spent a fortune on it, but failed to make it go. As my character Huck Finn would have said, it gave me the fantods to watch that cussed machine.

I quickly soured on Paige. Paige was full of himself, a real daisy. He took transient notoriety for fame, and consequently he had to get his hat enlarged. Paige and I always met on effusively affectionate terms, yet he knew perfectly well that if I had him in a steel trap I would shut out all human succor and watch that trap until he died.

If not for Paige, I might have recovered my financial losses. But that nightmarish machine continued to plague my dreams as well as my pocketbook. I could shake the machine only by leaving Hartford, leaving behind my beloved home, my finances depleted.

I'd tried in vain to civilize and perfect that infernal machine. In fact I'd given up entirely on the idea of civilizin' that machine. I'd been there before.

M.T. April 1, 1899

Mark Twain's involvement with the Paige Typesetting Machine is the subject of an exhibit in Gordon Library, now through March 31.

...tuition

(continued from page 2)

increases as a lame excuse for your own. Tuition increases could be avoided in several ways, through energy conservation, cutting costs and eliminating waste. Surely WPI realizes savings exist in these areas. And of course, don't forget the alumni. The alumni would be much more impressed by efforts at conservation and cost cutting, than simply showing a $30,770 deficit in the operating budget.

Everyone must make sacrifices. WPI students expect to make some, should the college be an exception? I say no.

If you are a student concerned about the tuition increases, let the Board of Trustees know. Write to Paul S. Morgan, Chairman of the WPI Board of Trustees, 449 W. Main St., Shrewsbury, or Howard G. Freeman, Vice-chairman of the WPI Board of Trustees, 16 Montclair Drive, Worcester.

You can even cut this letter out and mail it. All it takes is a fifteen-cent stamp and five minutes of your time. You decide. Is it worth it???

Sincerely,
Thomas A. Barrett '82

...kid commuter

(continued from page 3)

commuter wrote in and asked why the wedge and all the classrooms were empty for three weeks in January (someone actually did send it, no lie). Claiming to have come back every day for the three weeks, he seeks advice.

Well right now I'm working on the problem. I've contacted many high WPI officials, but still have not been able to summize an answer. I'll have to wait until they're sober, I guess.

For next term I, as Kid Commuter columnist (every now and then), would like to try something different. Instead of responding to your questions, I'd like to try and respond to your answers. So for D-term, think of some good answers and send them along to Kid Commuter, c/o *WPI Newspeak*, Box 2472, and I'll be sure to question them for you.

...Comps

(continued from page 3)

four seasons. And because they are so far out in the Solar System, Neptunians remain aloof and find it hard to be hospitable to those who just drop in." A second printing has not been called for.

Neptune is soon to be elevated to the status of being the planet most remotely positioned in the solar system. In an interview for *Friendly Orb*, the eminent scientist and former carrot placer at Rockingham Park, Dr. Ephretta Von WonWinnerwin was quoted as saying: "Those heavy elements — how they can elevate it like that is beyond me."

Neptune can be seen in the North American sky about the time of the Guru Purnama. It will be off to the viewer's right just above the horizon between the big dipper and "Eat at Sweeney's" advertising plane.

Based upon the foregoing and your general knowledge of Chemistry, answer the following:

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